

Multi-focal skeletal tuberculosis, bone scan appearance: a case report

Nayyar Rubab^{1*}, Shehzad Afzal², Muhammad Babar Imran³, Muhammad Mahboob Alam⁴

European Journal of
Medical Case Reports

Volume 3(3):125–129

© EJMCR. <https://www.ejmcr.com/>

Reprints and permissions:

<https://www.discoverpublish.com/>

<https://doi.org/10.24911/ejmcr/>

173-1562748421

ABSTRACT

Background: Skeletal tuberculosis accounts for 1% to 5% of all tuberculosis (TB) cases. Multifocal skeletal tuberculosis is rare. Early diagnosis of multifocal skeletal TB is crucial and challenging for proper treatment and to prevent development of complications. The purpose of this case report is to highlight importance of bone scan in suspected cases of skeletal tuberculosis.

Case Presentation: We describe a case of 24-year-old female, referred to Nuclear Medicine Department for bone scintigraphy. Patient had complaint of neck stiffness and generalized body aches. Patient underwent ^{99m}Tc-methylene diphosphonate scintigraphy which showed multifocal bony pathology mimicking bony metastasis. However, patient was treated with anti-tuberculous therapy and showed excellent response on follow up bone scan. Post-therapy: patient recovered without developing any complications.

Conclusion: Multifocal skeletal tuberculosis must be kept in the differential diagnosis of multifocal bony pathology seen on bone scintigraphy.

Keywords: Bone scintigraphy, multifocal bony pathology, multifocal skeletal tuberculosis, Case report.

Received: 18 July 2019

Accepted: 01 November 2019

Correspondence to: Nayyar Rubab

Type of Article: Case Report

Specialty: Nuclear Medicine

*Department of Nuclear Medicine, PINUM Cancer Hospital, Faisalabad, Pakistan.

Funding: None

Email: nayyar611@yahoo.com

Full list of author information is available at the end of the article.

Conflict of interests: None.

Background

Skeletal tuberculosis is uncommon but one of the most common forms of extrapulmonary tuberculosis accounting for 1%–5% of all tuberculosis (TB) cases. It can be unifocal or multifocal; however, multifocal skeletal TB is rare and accounts for 10% of all osteoarticular TB cases. Most commonly affected site of skeletal TB is the spine followed by hip and knee joints [1,2].

Skeletal tuberculosis is common in the areas where tuberculosis prevalence is high [3]. Here, we present a case of multifocal skeletal TB which was reported as multifocal bony pathology on bone scintigraphy. On the basis of history, clinical suspicion, laboratory tests and bone scan findings; presumptive diagnosis of skeletal tuberculosis was made. The patient underwent anti-tuberculous therapy for a period of 12 months and recovered without any complications.

Case Presentation

A 24-year-old female patient was referred for bone scintigraphy to Nuclear Medicine Department with history of generalized body aches, mass in right supraclavicular region, and neck stiffness. The referring physician was suspecting tuberculosis. The patient was symptomatic for 2 weeks. She had no history of low-grade fever, change in appetite, and night sweats. Her weight was 45 kg.

Her complete blood counts, renal, and liver function tests were within normal limits. However, Erythrocyte

Sedimentation Rate (ESR) was raised to 83 (0–18 mm) and Mantoux test was positive. Ultrasonography of neck for palpable mass (right neck) showed a hypoechoic area measuring 27 mm × 13 mm × 15 mm above supraclavicular region. No cervical lymphadenopathy was appreciated. Fine needle aspiration cytology of right supraclavicular mass showed a large number of polymorphs and degenerative cells with background of necrotic material. No atypical cells were seen. ZN stained smear was unremarkable for acid fast bacillus.

Bone scintigraphy was performed with ^{99m}Tc-methylene diphosphonate. Bone Scintigraphy showed multiple foci of abnormal radiotracer uptake in sternum, upper cervical vertebrae, multiple thoracic vertebrae, and left sided ribs. Foci in sternum and upper thoracic vertebrae were of doughnut appearance (central photon deficient area). It was concluded as multifocal bony pathology and further work up was suggested for characterization of lesions (Figure 1). Bone marrow aspiration was done and it showed normocellular bone marrow. However, her qualitative polymerase chain reaction (PCR) for Mycobacterium tuberculosis (MTB) DNA was positive.

Anti-tuberculous therapy was started with the probable diagnosis of multifocal skeletal tuberculosis and continued for 12 months along with physiotherapy for neck stiffness. Symptoms of the patient resolved gradually after anti-tuberculous therapy.

Follow up bone scintigraphy was done after 3 years which showed abnormal radiotracer uptake in D-3/D-4 vertebrae only, suggesting complete regression of disease in other areas mentioned in previous bone scan (Figure 2). Correlative Single-photon emission computed

tomography (SPECT/CT) showed abnormal increased tracer uptake in vertebral body of D-4 vertebra and adjacent costovertebral joint (Figure 3).

Abnormal tracer accumulation at D3/D4 considered metabolic healing response, and patient did not underwent

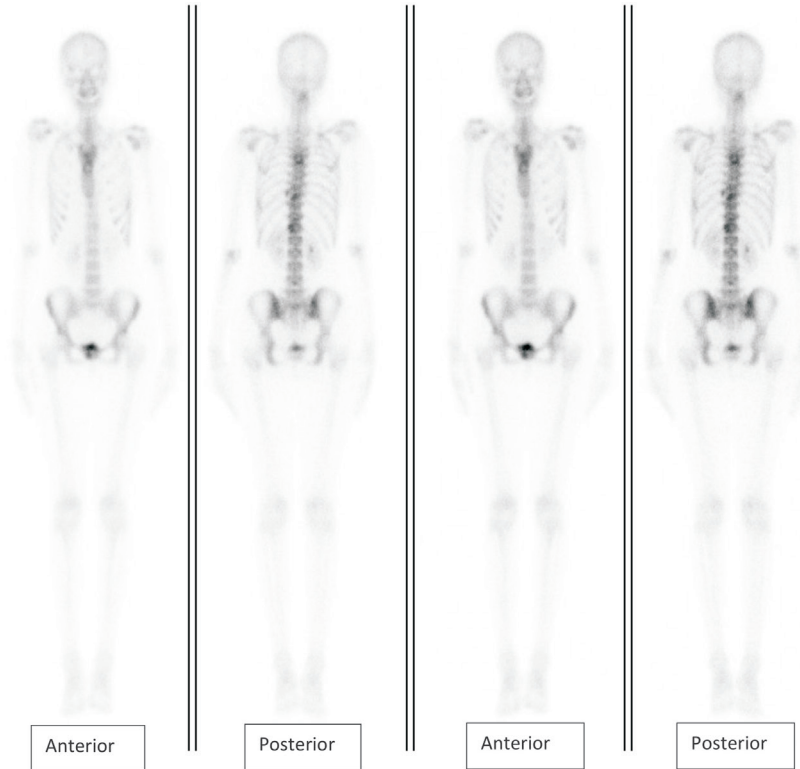


Figure 1. Bone scintigraphy showing multifocal bony pathology, before start of anti-tuberculous therapy (ATT).

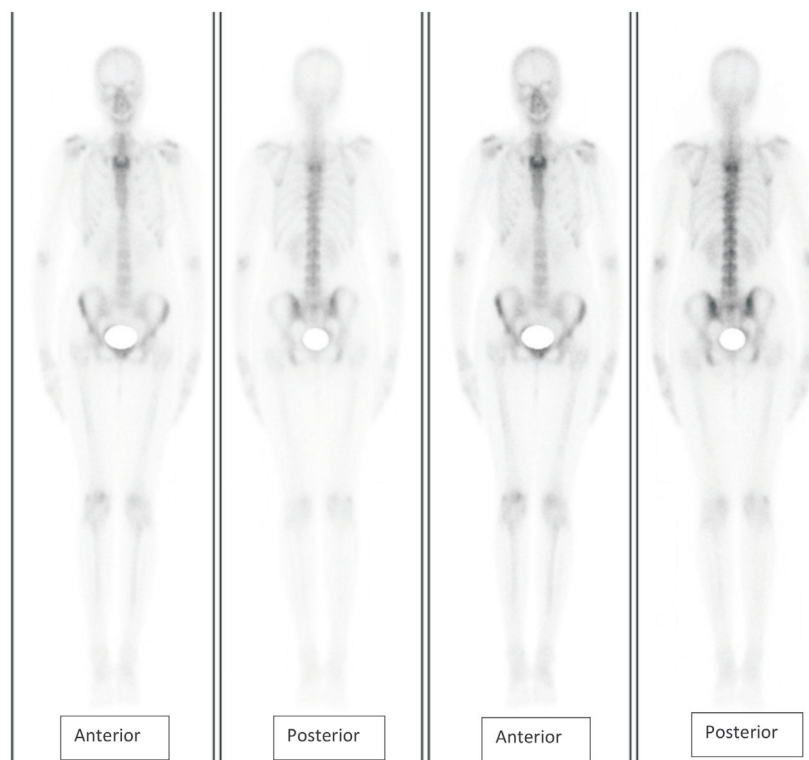


Figure 2. Bone scintigraphy after ATT, showing focal tracer accumulation at D-3/D-4 vertebrae only.

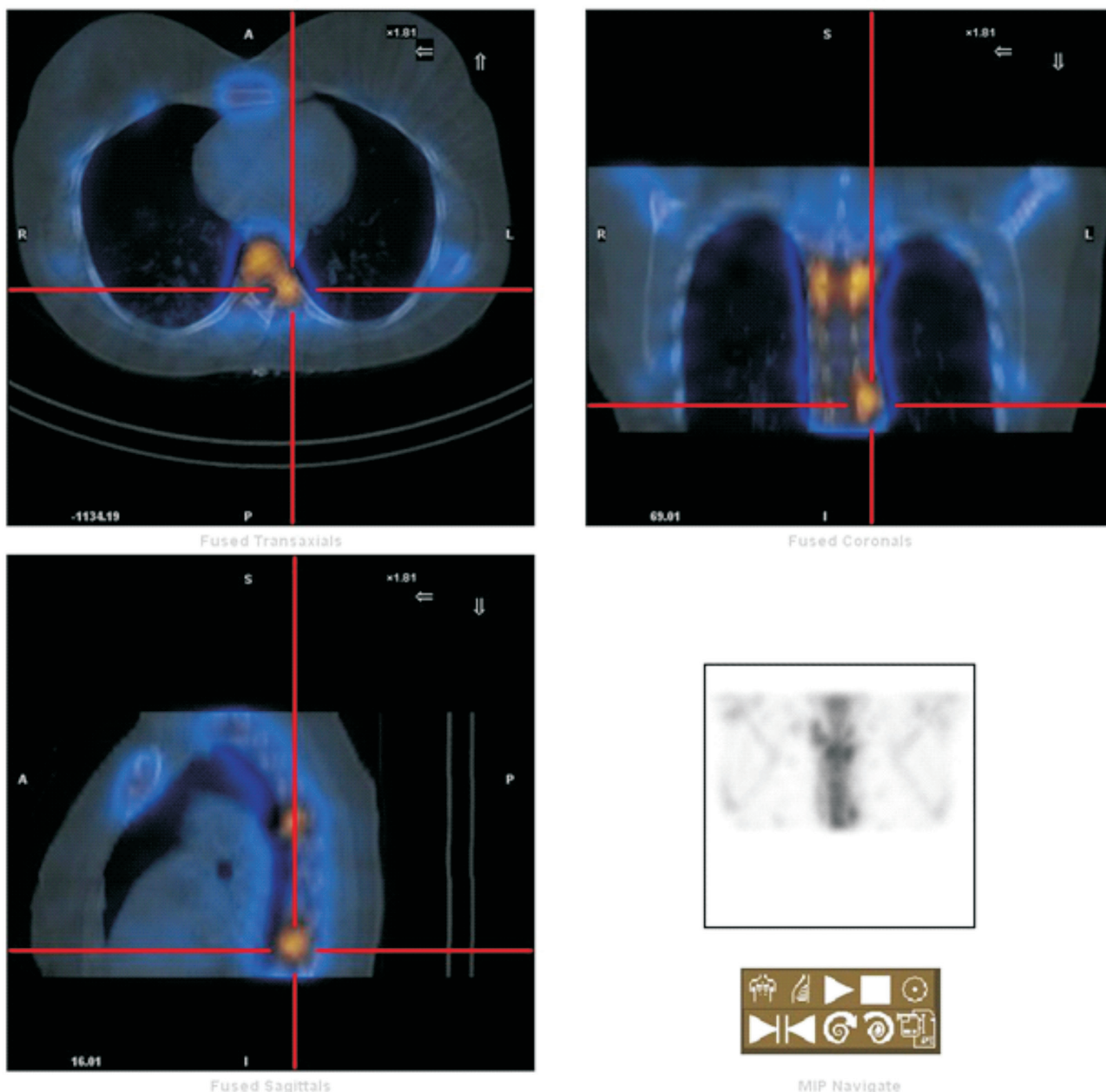


Figure 3. SPECT/CT showed abnormal increased tracer uptake in vertebral body of D-4 vertebra and adjacent costovertebral joint.

any further investigations. After further 4 years, patient visited with complaints of generalized aches and pain. Her X-ray spine was unremarkable. Bone scintigraphy was performed to assess the skeleton especially the spine. It was negative for any metabolically active lesion suggesting complete regression of disease (Figure 4).

Discussion

Tuberculosis is a common mycobacterium infection which may lead to morbidity or mortality if left untreated. Skeletal tuberculosis is still prevalent in the developing countries and the most common affected site is the thoracolumbar spine. Usually solitary lesions are seen in skeletal TB. In multifocal skeletal TB, osteoarticular lesions occur simultaneously at two or more locations [1].

Symptoms of skeletal tuberculosis are nonspecific like anorexia, loss of weight, myalgia, fever, etc. Specific symptoms depend on the organ involved. Most commonly involved systems are the lymph nodes, joints, central nervous system, genitourinary system, and gastrointestinal system. Least commonly affected are pleura, pericardium, peritoneum, adrenal glands, and eyes. In our case, there was multifocal involvement of different bones by TB without joint involvement. Clinical course of skeletal tuberculosis is indolent leading to late diagnosis and development of complications [4].

Diagnosis of multifocal skeletal tuberculosis is challenging and difficult. Multi-focal bony involvement may mimic bone metastases, infiltrative disorder, eosinophilic granuloma leading to misdiagnosis and inadequate

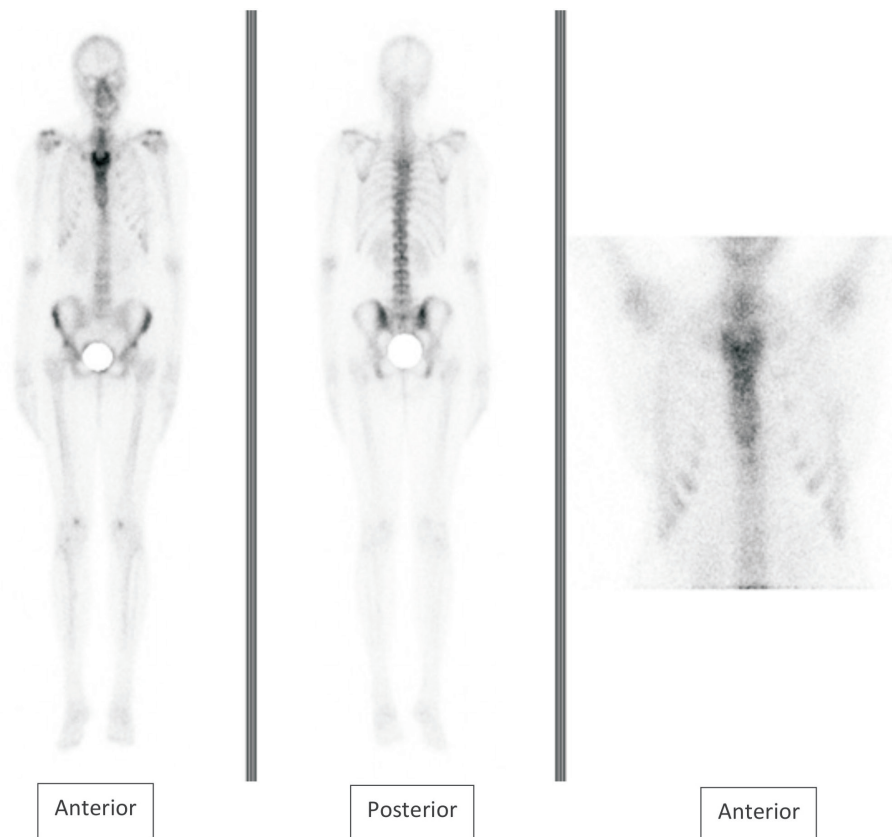


Figure 4. Bone scintigraphy performed after 4 years of previous scan, showing normal symmetrical tracer uptake bilaterally in the entire imaged skeleton, suggesting complete regression of disease.

treatment [5]. The diagnosis of multifocal skeletal tuberculosis is often delayed because clinical symptoms and radiological findings are neither sensitive nor specific. Conventional microbiological methods like Ziehl–Neelson staining (Z–N smear) for Acid Fast Bacilli (AFB) and culture for *Mycobacterium tuberculosis* have lower sensitivity and specificity. PCR is considered successful for the rapid diagnosis of spinal TB but it is not routinely used for its management. Diagnosis of tuberculosis mostly depends on histological evidence, which may be sometimes inconclusive [6].

Magnetic resonance imaging (MRI) is widely used by clinicians for diagnosis of spinal TB. The common findings on MRI are vertebral involvement without destruction of intervertebral disc. However these findings may mimic bone lymphoma, multiple myeloma, bone metastases, and tuberculous spondylitis [7].

Skeletal scintigraphy plays an important role in the diagnosis and evaluation of multifocal skeletal tuberculosis. Whole body imaging can detect all skeletal tuberculous lesions in patients suffering from pain without known systemic disease or history of malignancy. Bone scintigraphy is generally not indicated in survey of tuberculosis; however, it plays an important role in detection of asymptomatic lesions, establishing the diagnosis of multifocal skeletal TB and during follow up to assess response to therapy [1,2]

In our case, MRI was not done. Bone scan in our patient showed multiple atypical foci of radiotracer uptake in sternum, rib cage, and vertebrae which were more in favor of osseous metastasis; however, possibility of multifocal tuberculosis was not ruled out. The referring physician treated patient with anti-tuberculous therapy on the basis of positive PCR test and post-therapy bone scan showed regression of lesions.

Mainstay of treatment for bone tuberculosis is anti-tuberculous therapy, and the course of treatment can last from 6–18 months. Surgery is indicated only in case of spinal deformities and neurological defects [8,9]. Our patient took ATT for 12 months and showed excellent response to therapy. At present patient is active and having a normal healthy life.

Conclusion

Multifocal skeletal TB must be kept in mind while reporting bone scan with multifocal bone lesions in patient with no history of malignancy and trauma in countries like Pakistan, where incidence of TB is high. Serial follow-up bone scan can help in assessing response to therapy.

List of Abbreviations

ATT	Anti-tuberculous therapy
ESR	Erythrocyte Sedimentation Rate
MDP	Methylene diphosphonate
MRI	Magnetic resonance imaging

MTB Mycobacterium tuberculosis
 PCR Polymerase chain reaction
 SPECT Single-photon emission computed tomography
 TB Tuberculosis

Consent for publication

Informed consent was obtained from the patient to publish this case.

Ethical approval

Ethical approval is not required at our institution for publishing a case report in a medical journal.

Author details

Nayyar Rubab¹, Shehzad Afzal¹, M. Babar Imran¹, Muhammad Mahboob Alam²

1. Department of Nuclear Medicine, PINUM Cancer Hospital, Faisalabad, Pakistan
2. Department of Medicine, Abwa Medical College, Faisalabad, Pakistan

References

1. Assadi M, Nabipour I, Eftekhari M, Ebrahimi A, Abotorab SR. Diagnostic role of whole body bone scintigraphy in atypical skeletal tuberculosis resembling multiple metastases: a case report. *Journal of Medical Case Reports* 2009;3:141. <https://doi.org/10.1186/1752-1947-3-141>
2. Hu S, Guo J, Ji T, Shen G, Kuang A. Multifocal osteoarticular tuberculosis of the extremities in an immunocompetent young man without pulmonary disease: A case report. *Experimental and Therapeutic Medicine*. 2015;9:2299-2302. <https://doi.org/10.3892/etm.2015.2425>
3. Agarwal A, Khan SA, Qureshi NA. Multifocal osteoarticular tuberculosis in children. *Journal of Orthopaedic Surgery*. 2011;19(3):336-40. <https://doi.org/10.1177/230949901101900315>
4. Chowdhary GS, Purkayastha A, Mehta R. Multifocal Skeletal Tuberculosis mimicking Multiple Myeloma and secondary bone metastasis: An Unusual Case Scenario. *Archives of Medicine and Health Sciences*. 2018;6(1). https://doi.org/10.4103/amhs.amhs_116_17
5. Zhang Y, Hao CZ, Liu H, Hou H, Hang HZ. Multiple metastasis-like bone lesions in scintigraphic imaging. Review Article. *Journal of Biomedicine and Biotechnology*. 2012. <https://doi.org/10.1155/2012/957364>
6. Pandey V, Chawla K, Acharya K, Rao S, Rao S. The role of polymerase chain reaction in the management of osteoarticular tuberculosis. *Int Orthop*. 2009;33(3):801-805. <https://doi.org/10.1007/s00264-007-0485-8>
7. Wu M, Su J, Yan F, Cai L, Deng Z. Skipped multifocal extensive spinal tuberculosis involving the whole spine. A case report and literature review. *Medicine*. 2018;97:3. <https://doi.org/10.1097/MD.00000000000009692>
8. de Araujo PSR, de Melo HRL, de Melo FL, Medeiros Z, Maciel MA, Florencio R et al. Multifocal skeletal tuberculosis in an immunocompetent patient: a case report. *BMC Infectious Diseases*. 2015;15:235 <https://doi.org/10.1186/s12879-015-0985-x>
9. Do Brito JS, Tirado A, Fernandes P. Surgical treatment of spinal tuberculosis complicated with extensive abscess. *The Iowa Orthopaedic Journal*. 2014;34:129-136.

Summary of the case

1	Patient (gender, age)	24-year-old female
2	Final diagnosis	Multifocal skeletal TB
3	Symptoms	Generalized body aches, mass in right supraclavicular region and neck stiffness
4	Medications	Anti-tuberculous therapy
5	Clinical procedure	Bone scintigraphy
6	Specialty	Nuclear Medicine